

# Site-specific

## Outdoor Worker Equation Inputs for Dust

Variable	Value
TR (target cancer risk) unitless	0.000001
k (dissipation rate constant) yr <sup>-1</sup>	0.0
EF <sub>ow</sub> (exposure frequency) day/yr	250
F <sub>AM</sub> (area and material factor) unitless	1
ET <sub>ow</sub> (worker exposure time) hr/day	4
t <sub>ow</sub> (time - worker) yr	6
F <sub>OFFSET</sub> (off-set factor) unitless	1
SLF (Silt Loading Factor) cm <sup>2</sup> /kg	6.67E+08
GSF <sub>c</sub> (outdoor surfaces gamma shielding factor) unitless	1
IFD <sub>ow</sub> (dust ingestion factor - outdoor worker) cm <sup>2</sup>	32
IRA <sub>ow</sub> (dust inhalation rate - outdoor worker) m <sup>-3</sup> /hr	2.5
ED <sub>ow</sub> (exposure duration - outdoor worker) yr	6
Slab size for ACF (area correction factor) m <sup>-2</sup>	5
FTSS <sub>h</sub> (fraction transferred surface to skin - hard surface) unitless	0.5
SE (saliva extraction factor) unitless	0.5
SA <sub>ow</sub> (surface area of fingers - outdoor worker) cm <sup>-2</sup>	16
FQ <sub>ow</sub> (frequency of hand to mouth - outdoor worker) events/hr	2
City (Climatic Zone) PEF Selection	26
A <sub>c</sub> (acres)	0.5
Q/C <sub>wind</sub> (inverse of the ratio of the geometric mean air concentration to the emission fl	88.426903677711
V (fraction of vegetative cover) unitless	0.5
U <sub>m</sub> (mean annual wind speed) m/s	3.89
U <sub>t</sub> (equivalent threshold value)	11.32
F(x) (function dependent on U <sub>m</sub> /U <sub>t</sub> , derived using Cowherd et al. (1985)) unitle	0.0391
PEF <sub>w</sub> (Wind Particulate Emission Factor) m <sup>-3</sup> /kg	11146233404.681
A (Dispersion Constant) - wind	13.8139
B (Dispersion Constant) - wind	20.1624
C (Dispersion Constant) - wind	234.2869
A (Dispersion Constant) - mechanical	12.9351
B (Dispersion Constant) - mechanical	5.7383
C (Dispersion Constant) - mecahnical	71.7711
Q/C <sub>m</sub> (inverse of the ratio of the geometric mean air concentration to the emission flux	23.017850304789
F <sub>D</sub> (Dispersion correction factor) unitless	0.1853018553414

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Variable	Value
W <sub>d</sub> / Width of road segment (ft)	20
L <sub>d</sub> / Length of road segment (ft); Calculated from As above.	147.58048651498
A <sub>R</sub> / Area (m <sup>2</sup> )	274.21339877403
k-up / Particle size multiplier for public unpaved road (lb/VMT)	1.8
sL / Road surface silt loading (g/m <sup>-2</sup> )	0.015
W / (mean vehicle weight) tons	3.2
C / Emission factor for fleet exhaust, brake and tire wear	0.00047
p / number of days in a year with at least 0.001 inches of precipitation	150
km per road class	0.0449825322897
s / road surface silt content (%)	8.5
a-p / Aerodynamic particle size constant (unitless)	1
c-p / Aerodynamic particle size constant (unitless)	0.2
d-p / Aerodynamic particle size constant (unitless)	0.5
S / mean vehicle speed (miles/hr)	55
M / Surface material moisture content (%)	7.9

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## Outdoor Worker Surface Preliminary Remediation Goals for Dust - Secular Equilibrium

Radionuclide	Ingestion SPRG TR=0.000001 (pCi/cm <sup>2</sup> )	Inhalation Mechanical SPRG TR=0.000001 (pCi/cm <sup>2</sup> )	Inhalation Wind SPRG TR=0.000001 (pCi/cm <sup>2</sup> )	External Exposure SPRG TR=0.000001 (pCi/cm <sup>2</sup> )	SPRG Wind TR=0.000001 (pCi/cm <sup>2</sup> )	SPRG Mechanical TR=0.000001 (pCi/cm <sup>2</sup> )
*Secular Equilibrium SPRG for Cs-137	6.55E-01	-	9.90E+00	2.75E+01	6.01E-01	6.40E-01
*Secular Equilibrium SPRG for Pb-210	1.02E-02	-	3.61E-02	1.13E+03	7.97E-03	1.02E-02
*Secular Equilibrium SPRG for Pb-214	1.02E-02	-	3.60E-02	9.16E+00	7.95E-03	1.02E-02
*Secular Equilibrium SPRG for Po-210	1.45E-02	-	7.68E-02	1.65E+06	1.22E-02	1.45E-02
*Secular Equilibrium SPRG for Sr-90	3.55E-01	-	2.57E+00	2.93E+02	3.11E-01	3.54E-01

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## Outdoor Worker Risk for Dust - Secular Equilibrium

Radionuclide	Ingestion Risk	Inhalation Mechanical Risk	Inhalation Wind Risk	External Exposure Risk	Risk Wind	Risk Mechanical
*Secular Equilibrium Risk for Cs-137	7.40E-07	-	4.90E-08	1.76E-08	<b>8.07E-07</b>	<b>7.58E-07</b>
*Secular Equilibrium Risk for Pb-210	4.95E-04	-	1.40E-04	4.47E-09	<b>6.35E-04</b>	<b>4.95E-04</b>
*Secular Equilibrium Risk for Pb-214	1.64E-05	-	4.67E-06	1.83E-08	<b>2.11E-05</b>	<b>1.65E-05</b>
*Secular Equilibrium Risk for Po-210	6.97E-04	-	1.32E-04	6.13E-12	<b>8.28E-04</b>	<b>6.97E-04</b>
*Secular Equilibrium Risk for Sr-90	7.50E-07	-	1.04E-07	9.09E-10	<b>8.54E-07</b>	<b>7.51E-07</b>
<b>*Total Risk</b>	<b>1.21E-03</b>	-	<b>2.76E-04</b>	<b>4.14E-08</b>	<b>1.49E-03</b>	<b>1.21E-03</b>